In conclusion, we congratulate the author on having carried out so formidable a task as the compilation of these tables apparently single-handed. Should a second edition be necessary, revision of some parts and condensation to two-thirds its present bulk would make it a decidedly useful work.

J. A. H.

OUR BOOK SHELF.

Natural and Artificial Sewage Treatment. By Jones and Roechling. Pp. vii + 96. (London: Spon, 1902.)

THE authors state that they are making public in the above treatise information which they have already brought before different societies of professional men, but they claim that while putting the matter forward in a new form, they have also brought it up to date. This is doubtless the case with the statements concerning treatment of sewage on the land, but the treatment by bacteria beds is not so satisfactorily brought up to the date of publication. In fact, the impression produced by a careful perusal of the book is that the presentation of the two methods of treatment by land and by bacteria tanks and beds is such as to indicate a very considerable predilection for the sewage farm. This impression is caused, not by an overstatement of the results of sewage farming, but by an understatement of the permanency and advantages of an artificial bacterial installation. The authors do not lay stress, as they should in fairness do, on the fact that what they term the "artificial" bacterial treatment is the bacterial treatment of the sewage farm carried out under regulated and controlled conditions which add much to the precision, uniformity and regularity of the process of purification. When they place to the advantage of land treatment that it removes pathogenic germs, they are on doubtful ground; and when they speak of the entire loss of manurial value and the production of larger volume of effluent by the artificial bacterial process as disadvantageous, they apparently forget that bacterial effluents are not infrequently directly or indirectly used in certain parts of the year for irrigation, and further, that a larger volume of good effluent turned into a watercourse is usually of direct advantage.

Some statements are, moreover, open to serious question and have not been decided in the sense stated. Such is the oft-repeated one that treatment of ordinary sewage causes bacteria beds rapidly to silt up and that their material requires renewal, that their capacity is not permanently increased by resting, that they are peculiar in requiring careful management and that a covering of scum is necessary to the action in the so-called "septic tank." It should have been stated that beds which silt up are either improperly constructed, are being improperly treated or are receiving abnormal sewage, and that bacterial treatment, whether effected on land or in artificially constructed spaces, is identical in its cause and its nature and requires similar considerate management. Both processes have frequently failed because they have been inconsiderately provided for and dealt with.

If the above considerations are borne in mind, "district councillors, sanitarians and all interested in this complicated process" may with advantage peruse the little book, and they will find that, in the second part more especially, information of real value is presented in a lucid and intelligible form.

It might have been anticipated from the title of the book that chemical processes of treatment received notice. It is satisfactory to find that they are not dealt with, and that the terms "natural and artificial," as applied to sewage treatment, are intended to refer to land treatment and to so-called bacterial treatment respectively. It should be remembered that both these treatments are "naturally" effected in the main by the bacteria present in the sewage itself, and that the laying out of a sewage farm is as truly artificial as the provision of beds of flints, pebbles or other materials for so-called contact treatment.

Thomson's Gardener's Assistant. New Edition. Pp. viii + 607. (London: The Gresham Publishing Company, 1900–1902). Six Vols., 8*s.* each.

THIS important horticultural work, revised and entirely remodelled under the able direction and general editorship of Mr. W. Watson, Curator, Royal Gardens, Kew, has now been completed. It has been published in six divisional volumes, or in two volumes of 656 and 607 pages respectively. Many specialists have contributed to the work, and a glance at a list of their names with the articles for which they are severally responsible is sufficient to prove the value of this great addition to the literature of gardening.

Divisional vol. i. contains about forty pages on "Plant Structure," an epitome of such portions of botanical science as are of most interest to the gardener, by Dr. M. T. Masters. "Insect and other Plant Enemies," as also an article on "Garden Friends," are well treated by Mr. J. Fraser. Mr. G. Massee, our greatest authority, writes on "Plant Diseases caused by Fungi." All these articles are well illustrated and clearly and pleasantly written. Soils and manures are treated at length by Mr. Willis. Tools and instruments and garden structures are thoroughly dealt with, described and, when desirable, illustrated—the underlying principles being explained in a concise and lucid manner.

Divisional vol. ii. has articles, all well illustrated, on heating, propagation, transplanting, pruning, flower-garden and pleasure-grounds, hardy ornamental trees and shrubs, hardy herbaceous perennials, aquatic and bog plants, hardy and half-hardy annuals and popular garden plants.

Divisional vol. iii. treats on the greenhouse and conservatory, gives a select list of desirable stove and greenhouse plants with full cultural details. The orchids are fully treated by Mr. J. O'Brien, a descriptive list of the more important ones from a garden standpoint being given, together with full particulars as to their requirements and cultivation; plans of orchid houses even are given. Other special articles are those on ferns, palms and cycads, succulent plants, summer bedding, the subtropical garden, floral decorations, &c.

The remaining three divisional volumes deal fully and carefully with the fruit and kitchen garden. Lists of the best varieties are in each case given, and in some instances, under "Asparagus," for instance, the methods pursued by present-day market cultivators near London, and also about Paris, are described pretty fully.

Calendarial directions for each department of the garden for each month are contained towards the close of the last volume, in which are also treated the best methods of collecting, packing and storing vegetables, &c.

We think that, taken altogether, the present edition of "Thomson's Gardener's Assistant" may fairly be regarded as the standard book on British gardening.

G. N.

Proceedings of the Aristotelian Society. New Series. Vol. ii. Pp. 240. (London: Williams and Norgate, 1902.)

THIS collection of papers read before the Aristotelian Society during the session 1901–2 maintains the decidedly high level reached by previous volumes. For the professed metaphysician there will be special interest in the essays of Dr. G. F. Stout and Mr. H. W. Carr, who both take up, though on rather diverging lines,

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the task of disproving some of the contradictions discovered by Mr. F. H. Bradley in the "appearances" with which both popular and "scientific," as distinguished from philosophical, thought do their work. Dr. Stout's paper is specially important, as it deals with the concept of "relation," which is central for all discursive thinking. Mr. G. E. Moore discusses at great length and with considerable acuteness, though not, perhaps, without a tendency to *ignorantia elenchi*, the argument for human mmortality put forward in Dr. McTaggart's recent "Studies in Hegelian Cosmology." Mrs. Bryant's paper on the relation of mathematics to general formal logic, though far from easy reading, should be valuable to all who are interested in the problems of general scientific method. Unfortunately, it is disfigured by several misleading errors in the printing of symbols. Dr. Bosanquet supplies a most instructive defence of the ethical doctrines of T. H. Green against recent criticism. For the reader who is interested in topics of a more general kind, there are Mr. Boutwood's "Philosophy of Probability" and Mr. Goldsbrough's essay on "The Ethical Limits of Method in Philosophy." A. E. T.

Directions for Laboratory Work in Physiological Chemistry. By Holmes C. Jackson, Ph.D., Instructor in Physiological Chemistry, Bellevue Hospital Medical College. Pp. 62. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1902.)

THIS little book is intended especially as a guide to the author's own students, and it is a little difficult to understand why it should have a wider circulation. Every teacher has necessarily his own methods, and if all of them were to publish their own rough notes, the number of text-books would be endless. If there is marked originality in any particular teacher's methods, or if he has anything new and important in his material, there would be an excuse for publication, and other students and other teachers would then derive benefit from the book, but in the present case it is impossible to find any such reason. All one finds are directions for performing the stock elementary experiments commonly performed in practical classes. There is no pretence at completeness. The only spark of originality the work possesses is its incompleteness; each exercise is studded with marks of interrogation or terminated by a question or two. These, we imagine, are to be filled in or answered on the blank pages with which the book is interleaved. The student will, therefore, require a second book, or a very inquiring mind, in order that he may give the present note-book any semblance of completeness.

We imagine that the purpose of leaving out so much needful information is to stimulate the pupils to inquire for themselves. Such a method only appeals to the better class of student. It is the rank and file that a book such as this should aim at educating; the best students will find things out for themselves whatever method they are taught by.

The style of the book is as rough as its matter is incomplete; it is written in the note-book or blackboard manner, of which brevity is the soul, and in which such parts of speech as articles, nominatives and verbs are not regarded as essential constituents of a sentence. We have not come across anything in the shape of serious error, but that is hardly to be expected from a teacher of some experience; and doubtless many a first-year's student could write notes of his practical work which would be equally free from mistakes of this nature.

Die Zersetzung stickstofffreier organischen Substanzen durch Bakterien. By Dr. O. Emmerling. Pp. 151 + plates. (Braunschweig: Friedrich Vieweg u. Sohn, 1902.) Price 4 marks.

THIS book is the outcome of a series of lectures delivered by the author before a chemical audience, and is primarily intended for chemists, but is also adapted for all interested in the subject from a physiological standpoint. The treatment is in nature, but not in form, that of a lexicon, being a compilation which is intentionally incomplete, and practically devoid of critical observations and considerations of theory or method.

The work is divided into six sections—(1) fermentations accompanied by oxidation; fermentations yielding (2) lactic acid; (3) mucilage (*Schleim*); (4) butyric acid; (5) fermentation of cellulose; and (6) partly-unexplained fermentations. The fermented substances considered are practically entirely carbohydrates.

Of the 132 pages of text, sixty-one fall to lactic fermentation and, roughly, fifteen each to fermentations accompanied with oxidation, those yielding mucilage and butyric acid respectively, while that of cellulose receives seven.

The general mode of treatment in each section is enumeration of the more important organisms, with a short account of their characteristics, the subsidiary products of the fermentations and substances other than the specific one fermented by the organisms.

In the sections on lactic and butyric fermentations, two acceptable tables occur. These are divided into sections according with the compound fermented. Each section is divided into three columns, giving respectively the names of the organisms, the subsidiary products and the names of the authors responsible for the statements. In the case of lactic fermentations, the photogyric nature of the resulting acids is given.

The economic aspect of lactic fermentations is considered somewhat briefly, but comprehensively. The section devoted to partly-explained fermentations is practically only an enumeration.

The author constantly uses the word fungus (*Pilz*) as equivalent with Schizomycete, a fault that is botanically inexcusable. He also states that respiratory processes, in which small amounts of sugars are decomposed with production of natural gases, are to be strictly separated from fermentation. This is physiologically erroneous.

Seven photographic plates occur at the end. The figures are, on the average, good, although the focus of some is not perfect. The book will be useful to all who desire a partial summary of recent work on this subject within a small scope. F. ESCOMBE.

Das Motor-Zweirad und seine Behandlung. By Wolfgang Vogel. Pp. vii + 154. (Berlin: Gustav Schmidt, 1902.)

A NOTICE of Herr Vogel's "Schule des Automobilfahrers" appeared in NATURE of July 31, 1902 (vol. lxvi. p. 313), and reference was made in it to the motor cycle. In the little manual before us, the same author describes concisely the theory and action of the motor bicycle, and provides in text and illustration just the kind of information which the motorist will find of service. To readers familiar with German, the book will give many useful particulars on the construction of the machine and hints on its care and use.

A Course of Simple Experiments in Magnetism and Electricity. By A. E. Munby, M.A. Pp. xvi + 90. (London: Macmillan and Co., Ltd., 1903.) Price 1*s*. 6*d*.

THE careful instructions for the eighty-five experiments contained in this little book, together with the useful hints for the construction of apparatus, should serve very well to introduce young pupils to the practical study of magnetism and electricity. The author gives just enough guidance in the form of statements and suggestive questions to ensure that the experiments will be performed intelligently.

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